Before the **Federal Communications Commission** Washington, DC 20554

In the Matter of

Use of Portions of Returned 2 GHz Mobile Satellite Service Frequencies

IB Docket No. 05-221

REPLY COMMENTS OF SIRIUS SATELLITE RADIO INC.

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Sirius Satellite Radio Inc. ("Sirius"), by its attorneys, hereby replies to the comments submitted in response to the Federal Communications Commission's ("FCC" or "Commission") July 29, 2005 *Public Notice* in this proceeding.¹

I. INTRODUCTION AND SUMMARY.

Nearly all the commenters in this proceeding seek 2 GHz spectrum for a mobile telephony service (*e.g.*, Mobile-Satellite Service ("MSS") or terrestrial wireless).² However, the Commission has already made available more than sufficient spectrum to satisfy current demand for MSS and terrestrial wireless, and the commenters fail to present a public interest reason to bestow additional spectrum to *any* mobile telephony service.

In contrast, reallocating the entire 24 MHz of unassigned 2 GHz satellite spectrum to satellite digital audio radio service ("satellite DARS") and assigning it to Sirius would serve the

See Commission Invites Comments Concerning Use of Portions of Returned 2 GHz Mobile Satellite Service Frequencies, Public Notice, FCC 05-134, IB Docket No. 05-221 (June 29, 2005).

In addition to the commenters seeking additional spectrum for mobile telephony services, two commenters, Total RF Marketing and the Society of Broadcast Engineers, Inc., request that spectrum be returned to the Broadcast Auxiliary Service ("BAS"). Because the FCC already has determined that relocating BAS operations to other bands would serve the public interest and that 2 GHz spectrum is ideal for mobile services, there is no basis for granting their requests.

public interest. As Sirius explained in its initial comments,³ its 12.5 MHz of downlink spectrum is fully utilized. Sirius needs additional spectrum to allow for its continued success, subscriber and programming growth, and further service innovation, such as video and broadband offerings and telematics. Accordingly, the Commission should initiate a rulemaking proposing to (1) reallocate the 24 MHz of unassigned 2 GHz spectrum to satellite DARS, and (2) assign the full 24 MHz of spectrum to Sirius.⁴

II. THE COMMISSION SHOULD NOT RETAIN AN MSS ALLOCATION FOR THE 24 MHz OF UNASSIGNED 2 GHz SPECTRUM.

Preservation of the MSS allocation would not serve the public interest because the Commission's other MSS spectrum allocations are sufficient to satisfy demand now and in the future. A new MSS provider would only warehouse spectrum and postpone reallocation.

Likewise, it would be premature to bestow additional spectrum on the remaining two 2 GHz MSS licensees before they commence service and demonstrate spectrum loading.

A. Sufficient Spectrum Is Available to Meet Demand for MSS.

Currently, over 100 MHz of MSS spectrum is assigned to *six* licensees in the Big LEO, L- and 2 GHz bands. In the Big LEO band, Iridium has access to 8.25 MHz⁵ and Globalstar is

³ See Comments of Sirius Satellite Radio Inc., IB Docket No. 05-221, at 3-5, 10-12 ("Sirius Comments").

At the very least, to fulfill its spectrum management obligation to ensure that the 2 GHz spectrum is used efficiently and effectively, the Commission should consider in a single rulemaking all of the options for such spectrum. *See* Comments of CTIA – The Wireless AssociationTM, IB Docket No. 05-221, at 9-12 (July 29, 2005) ("CTIA Comments"); Sirius Comments at 3.

Iridium Constellation LLC et al. for Modification of Authority to Operate a Mobile Satellite System in the 1.6 GHz Frequency Band, Order, 19 FCC Rcd 17,474 (2004) (modifying Iridium's license to permit use of the 1618.25 to 1626.5 MHz frequencies).

licensed to use 27.85 MHz.⁶ In the L-band, Inmarsat currently holds 14 x 2 MHz in North America based on usage, as well as 20 x 2 MHz in Europe, Asia, Africa, and the Pacific areas.⁷ Similarly, Mobile Satellite Ventures ("MSV") has access to significant L-band spectrum.⁸ Finally, in the 2 GHz band, ICO and TMI collectively hold 16 MHz of spectrum.⁹ Beyond these specific assignments, the sizeable MSS spectrum allocations are depicted in Attachment A.

Importantly, these spectrum holdings already satisfy existing MSS demand. The rapid growth and consumer adoption of terrestrial wireless services has chilled demand for MSS.¹⁰ As

See Loral/Qualcomm Partnership, L.P., Application for Authority to Construct, Launch, and Operate Globalstar, a Low Earth Orbit Satellite System to Provide Mobile Satellite Service in the 1610-1626.5 MHz/2483.5-2500 MHz Bands, Order, 10 FCC Rcd 2333 (Int'l Bur. 1995) (licensing Globalstar to use 11.35 MHz in the L-band for uplink and 16.5 MHz in the S-band for downlink).

Inmarsat plc Prospectus, at 45 (June 1, 2005) ("Inmarsat Prospectus"), at http://about.inmarsat.com/investorrelations/default.aspx?top_level_id=6&language=EN&textonlyFalse. Moreover, ICO points out that Inmarsat has been authorized in the U.K. to use up to 66 MHz of L-band spectrum, subject to coordination via the Mexico City Agreement. See Comments of ICO Satellite Services G.P., IB Docket No. 05-221, at 13 (July 29, 2005) ("ICO Comments") (citing Comsat Corp., 16 FCC Rcd 21,661 (2001)).

Mobile Satellite Ventures Subsidiary LLC, Application for Authority to Launch, and Operate an L-band Mobile-Satellite Service Satellite at 101° W.L., Order and Authorization, 20 FCC Rcd 9752 (2005) (authorizing MSV-1 to operate on 10 MHz of spectrum in each transmission direction in the 1525-1544/1545-1559 MHz (space-to-Earth) and the 1626.5-1645.5/1646.5-1660.5 MHz (Earth-to-space) frequency bands and noting that AMSC-1 operates at the same frequencies); see also CTIA Comments at 4 n.12.

These two licensees each currently have the right to select 8 MHz of unassigned 2 GHz MSS spectrum (4 MHz of uplink spectrum and 4 MHz downlink spectrum) from the 2000-2020 MHz uplink band and the 2180-2200 MHz downlink band. See ICO Satellite Services G.P., Memorandum Opinion and Order, 20 FCC Rcd 9797 (¶ 34) (2005); TMI Communications and Company, Ltd. Partnership and TerreStar Networks Inc., Application for Review and Request for Stay, Memorandum Opinion and Order, 19 FCC Rcd 12,603, 12,622 (¶ 54) (2004).

See Sirius Comments at 8 n.16; Comments of Sirius Satellite Radio Inc., IB Docket No. 05-220, at 1-2 (July 13, 2005) ("Sirius 05-220 Comments"); Comments of Inmarsat Ventures Limited, IB Docket No. 05-220, at 2-4 (July 13, 2005) ("Inmarsat 05-220 Comments").

CTIA points out, "subscribers to MSS services *worldwide* numbered *only* 885,000 in 2004"¹¹ and, in fact, "the overall domestic subscriber count must be substantially less."¹² As a result, only two of the original five Big LEO MSS licensees commenced commercial operations¹³ and six of the original eight 2 GHz MSS licensees have lost or surrendered their licenses.¹⁴

B. Increasing the Spectrum Assignments of Existing MSS Licensees Would Not Serve the Public Interest.

Increasing the spectrum assignments of the remaining MSS licensees would not serve the public interest. Each of the existing 2 GHz licensees already has 8 MHz of spectrum, which is 3

¹¹ CTIA Comments at 11 (emphasis added).

Id.; see also Revision of the Commission's Rules to Ensure Compatibility With Enhanced 911 Emergency Calling Systems, Report and Order and Second Further Notice of Proposed Rulemaking, 18 FCC Rcd 25,340, 25,360 n.162 (2003) ("According to Globalstar, 'there are at most a few hundred thousand MSS subscribers total in the United States." (citation omitted)).

See Sirius Comments at 8 n.16; Review of the Spectrum Sharing Plan Among Non-Geostationary Satellite Orbit Mobile Satellite Service Systems in the 1.6/2.4 GHz Bands, Report and Order, Fourth Report and Order and Further Notice of Proposed Rulemaking, 19 FCC Rcd 13356, 13358-60, 13,364-67 (¶ 4-7, 19-23) (2004) ("Big LEO Spectrum Sharing Order").

Applications of Mobile Communications Holdings, Inc. for Modification of 2 GHz MSS License, and Constellation Communications Holdings, Inc. for Modification of 2 GHz MSS License, Memorandum Opinion and Order, 18 FCC Rcd 1094 (Int'l Bur. 2003) (canceling authorizations held by Constellation Communications Holdings, Inc. and Mobile Communications Holdings, Inc.); Application of Globalstar, L.P. For Modification of License for a Mobile-Satellite Service System in the 2 GHz Band, Memorandum Opinion and Order, 18 FCC Rcd 1249 (Int'l Bur. 2003) (canceling Globalstar L.P.'s authorization). Recently, three more 2 GHz MSS operators surrendered their authorizations – Iridium LLC on March 16, 2005, The Boeing Company on March 28, 2005, and Celsat America, Inc. on April 12, 2005. See Policy Branch Information Actions Taken, Report No. SAT-00280, DA 05-733 (Mar. 18, 2005) (noting the surrender of Iridium's 2 GHz MSS license); Policy Branch Information Actions Taken, Report No. SAT- 00282, DA 05-1000 (Apr. 1, 2005) (noting the surrender of Boeing's 2 GHz MSS license); Letter from David D. Otten, Chairman and Chief Executive Officer, Celsat, to Secretary, FCC, File No. SAT-A/O-19940408-00016/17/18, Call Sign S2139 (Apr. 12, 2005) (surrendering Celsat's 2 GHz license).

more MHz than the FCC concluded was "sufficient for commencement of service." Any additional, follow-on spectrum should be based not only on commercial experience and, in particular, system loading, but also on detailed information about such matters. 16 The two licensees cannot possibly meet this test now because, as Inmarsat points out, they "have retained their authorizations only through milestone waivers or extensions, and . . . still remain years away from actually deploying an MSS satellite network or commencing commercial operations."

In addition, Inmarsat has already fled the 2 GHz band. As TMI explains, "Inmarsat had once before professed an interest in the 2 GHz MSS spectrum but . . . once a firm commitment to this band drew near, Inmarsat changed its mind in favor of constructing a new L-band satellite system." Indeed, nearly five years after giving up on 2 GHz, Inmarsat still admits only to "developing plans" that are "expected to lead to the development of a state-of-the-art, next-generation MSS system." Inmarsat's own public statements suggest that, some eight years after the Commission initially decided to reallocate 2 GHz spectrum for MSS use, it still has

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Establishment of Policies and Service Rules for MSS in the 2 GHz Band, Report and Order, 15 FCC Rcd 16,127, 16,138 (¶ 17) (2000); see also CTIA Comments at 4.

Sirius Comments at 9.

Inmarsat 05-220 Comments at 3; *see also* Sirius Comments at 10; CTIA Comments at 3-7.

Comments of TMI Communications and Company Limited Partnership and Terrestar Networks, Inc., IB Docket No. 05-221, at 23-24 (July 29, 2005) ("TMI Comments"); *see also* Letter from Kelly Cameron, Counsel to Inmarsat to Magalie Roman Salas, FCC, File. No. 190-SAT-LOI-97 (Nov. 21, 2000) (withdrawing Inmarsat's Letter of Intent to provide 2 GHz MSS); ICO Comments at 13.

Inmarsat 05-220 Comments at 5.

neither developed a viable plan for operations in that band nor a serious commitment to it.²⁰ Thus, Inmarsat concedes its proposed use of the spectrum is vaporware until at least the "end of the decade." Such an inchoate level of planning and confidence provides little, if any, support for Inmarsat's call for the unassigned 2 GHz spectrum. In any event, Inmarsat already has access to significant MSS spectrum and is deploying new satellites to use that spectrum more efficiently²² – undermining entirely any stated justification for assigning it additional spectrum in the 2 GHz band.

III. THE COMMISSION SHOULD NOT REALLOCATE LIMITED SATELLITE SPECTRUM FOR ADDITIONAL TERRESTRIAL SERVICES THAT ALREADY HAVE AN ABUNDANCE OF SPECTRUM.

Given the difficulty of coordinating new satellite allocations internationally, the

Commission should endeavor to reassign this spectrum to deserving satellite providers instead of
providing terrestrial wireless operators with even more spectrum. Satellite spectrum remains

See TMI Comments at 22-24. In fact, Inmarsat recently has made clear that after its fleet of Inmarsat-4 *L-band* satellites is deployed, it "do[es] not anticipate the need for material capital expenditure for a new generation of satellites until 2014 at the earliest." Inmarsat Prospectus at 32.

Reply Comments of Inmarsat Ventures Ltd., IB Docket No. 05-220, at 3 (July 25, 2005) ("Inmarsat 05-220 Reply Comments").

Inmarsat 05-220 Comments at 9 ("Inmarsat is currently in the final stages of deploying its newest series of L-band satellites, the Inmarsat-4 series, which provide more than a twelve times spectrum efficiency improvement over its Inmarsat-3 satellite generation and thereby maintain an unrivalled grade of service in the face of greater demands for bandwidth, lower costs, and increasing competition. The high levels of spectrum reuse, small spot beams, and advanced coding techniques that are key-notes of the Inmarsat-4 spacecraft design will ensure that Inmarsat can continue to serve its existing customers while also meeting the demand for new broadband services in the near term. In fact, with the deployment of the Inmarsat-4 platform, Inmarsat will offer new and innovative services in the L-band, such the 3G-based Broadband Global Area Network (BGAN) service, which offers always-on IP services at data rates of approximately half a megabit – higher than have previously been possible over MSS spacecraft and over notebook-sized or smaller user terminals – which are expected to be available in the U.S. early in 2006.")

scarce.²³ Awarding additional 2 GHz spectrum to terrestrial wireless operators would not further the public interest.

As shown in Attachment B, the Commission has already allocated, or otherwise made available, more than 700 MHz of spectrum below 4 GHz for licensed terrestrial wireless operations and approximately 675 MHz for unlicensed terrestrial devices.²⁴ While a significant portion of this spectrum is already in use, the Commission soon will add an impressive amount of additional spectrum for advanced wireless services.²⁵ Beginning in 2006, the Commission is expected to begin auctions for:

- 60 MHz of "beach-front property" in the 700 MHz bands formerly occupied by television broadcast stations;²⁶
- 10 MHz of spectrum immediately adjacent to the 2 GHz broadband PCS allocation (this is in addition to 10 MHz of PCS spectrum that has been awarded to Nextel Communications, Inc. for resolving interference in the 800 MHz band);²⁷ and

See Sirius Comments at 6-7.

In addition, in 2002, the FCC amended Part 15 of its rules to permit operation of devices incorporating ultra-wideband ("UWB") technology in the 1.99-10.6 GHz, 3.1-10.6 GHz, and 22-29 GHz frequency bands, depending on the type of device. *See Revision of Part 15 of the Commission's Rules Regarding Ultra-Wideband Transmission Systems*, First Report and Order, 17 FCC Rcd 7435, 7438 (2002); *Erratum*, 17 FCC Rcd 10505 (2002). UWB technology provides additional spectrum that can be used for terrestrial wireless operations. Indeed, the FCC has found that UWB can be used "for wireless communications, particularly for short-range high-speed data transmissions suitable for broadband access to networks." *Revision of Part 15 of the Commission's Rules Regarding Ultra-Wideband Transmission Systems*, Memorandum Opinion and Order and Further Notice of Proposed Rule Making, 18 FCC Rcd 3857, 3859 (2003).

Comments of the Satellite Industry Association, IB Docket No. 05-221, at 4 (July 29, 2005) ("SIA Comments"); TMI Comments at 24-25.

See Federal Communications Commission Media Bureau Staff Report Concerning Overthe-Air Broadcast Television, MB Docket No. 04-210, at 19-22 (¶ 44) (Feb. 28, 2005), at http://hraunfoss.fcc.gov/edocs/public/attachmatch/DOC-257073A1.pdf.

See Improving Public Safety Communications in the 800 MHz Ban, Report and Order, Fifth Report and Order, Fourth Memorandum Opinion and Order, and Order, 19 FCC Red

• 90 MHz of former Federal Government spectrum at 1.7/2.1 GHz.²⁸

This entire 160 MHz of spectrum is intended to complement and expand the service offerings currently being provided by wide-area commercial cellular and PCS networks.

Additional spectrum for commercial terrestrial services will also soon be made available, including:

- 8 MHz of spectrum near the 1.4 GHz band;
- 50 MHz of spectrum at 3650-3700 MHz; and
- 30 MHz of 2 GHz spectrum previously reallocated from MSS.

This additional spectrum is all expected to bring new competitive services to the American public. Indeed, the amount of available terrestrial frequencies dwarfs the spectrum currently allocated to satellite DARS.²⁹

Such existing and future spectrum is more than sufficient to realize any public interest benefits that are specific to terrestrial wireless service. Indeed, the Commission has recently determined that wireless carriers "generally have access to the spectrum they need to offer next-generation services now." Ample frequencies also already exist for Wi-Fi and Wi-Max

^{14,969 (2004),} as amended by Erratum, 19 FCC Rcd 19,651 (2004), and Erratum, 19 FCC Rcd 21,818 (2004) ("800 MHz R&O").

See FCC Modifies Advanced Wireless Service Rules To Provide Greater Flexibility and Access To Spectrum For Small And Rural Providers, Public Notice (Aug. 5, 2005), at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-260432A1.doc.

The FCC initially allocated 50 MHz (2310-2360) to satellite DARS, but "only 25 MHz remains exclusively for DARS." *See Establishment of Rules and Policies for the Digital Audio Radio Satellite Service in the 2310-2360 MHz Frequency Band*, Report and Order, Memorandum Opinion and Order and Further Notice of Proposed Rulemaking 12 FCC Rcd 5754, 5771 (¶ 40) (1997). Of the 25 MHz, Sirius holds 12.5 MHz (2320-2332.5 MHz) and XM holds 12.5 MHz (2332.5-2345).

Applications of Western Wireless Corp. & Alltel Corp., FCC 05-138, ¶ 73 (July 19, 2005); see also Applications of AT&T Wireless Servs., Inc. & Cingular Wireless Corp., 19 FCC Rcd 21,522, 21,577 (¶ 139) (2004); Reply Comments of TMI and TerreStar, IB Docket No. 05-220, at 16 (July 25, 2005) ("TMI 05-220 Reply Comments").

operations.³¹ As shown in Attachment B, approximately 675 MHz is allocated for unlicensed terrestrial wireless operations. This spectrum may be used Wi-Fi and Wi-Max operators, among others, to provide service that is substitutable for the mobile offerings of MSS and terrestrial wireless operators.³² Importantly, no commenter has offered any evidence that 675 MHz is insufficient to meet the demand for such "unproven" technologies.³³

In addition, terrestrial mobile telephony does not need additional spectrum because it is already vigorously competitive. As the Commission's own most recent review of the data concluded, "[d]uring 2003, the CMRS industry continued to experience increased service availability, intense price competition, innovation, and a wider variety of service offerings." Thus, as the Commission has found, "[c]ontinued downward price trends, the continued expansion of mobile networks into new and existing markets, high rates of investment, and churn

See Caroline Gabriel, Debate Over TV Spectrum Highlights WiMax Ambitions, WiMax Trends (2004), at http://www.wimaxtrends.com/articles/archives/a071904a.htm (noting that Intel is "a vocal campaigner for more liberal approaches to spectrum suitable for Wi-Fi and WiMAX").

See TMI 05-220 Reply Comments at 5. In addition, the Commission is considering making even more spectrum available for unlicensed devices, including Wi-Max. See Unlicensed Operation in the TV Broadcast Bands, Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band, Notice of Proposed Rulemaking, 19 FCC Rcd 10,018 (2004).

Colin C. Haley, *Nokia*, *Intel Pen Wi-Max Pact*, Wi-Fi Planet (June 10, 2005), *at* http://www.wi-fiplanet.com/wimax/article.php/3511856 (describing Wi-Max as an "unproven" technology); Alex Salkever, *Before Wi-Fi Can Go Mainstream*, BusinessWeek Online (Feb. 18, 2004), *at* http://www.businessweek.com/technology/content/feb2004/tc20040218_4891_tc140.htm (same); *see also* Evan Hansen, *Sports Venues Look to Score With Wireless, HDTV*, CNET News.com (Oct. 22, 2004), *at* http://news.com.com/Sports+venues+look+to+score+with+wireless,+HDTV/2100-1039_3-5419886.html; *Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services*, Ninth Report, 19 FCC Rcd 20,597, 20,687-88 (¶¶ 218-221) (2004) ("2004 Competition Report") (describing Wi-Fi's limitations).

³⁴ 2004 Competition Report, 19 FCC Rcd at 20,608 (¶ 20).

rates of about 30 percent, when considered together with . . . other metrics, demonstrate *a high level of competition* for mobile telephone consumers."³⁵ The implementation of local number portability ("LNP"), moreover, has even further expanded competition in this telecommunications marketplace.³⁶ In sum, the Commission should not reallocate any additional satellite frequencies to terrestrial services.³⁷

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Implementation of Section 6002(b) of the Omnibus Reconciliation Act of 1993, Eighth Report, 18 FCC Rcd 14,783, 14,904 (2003) ("2003 Competition Report") (emphasis added).

See 2004 Competition Report, 19 FCC Rcd at 20,601 (¶ 4) (noting that "there is evidence to suggest that competitive pressure on carriers to retain existing customers has increased as a result of LNP"); *id.* at 20,610 (¶ 25) (same); *Remarks by Commissioner Kathleen Q. Abernathy*, 2004 FCC LEXIS 2473, *14 (May 13, 2004) (Commission data shows that "the introduction of wireless number portability has increased customer choice and created even greater flexibility for consumers.")

The FCC has already reallocated nearly half of the original 2 GHz MSS spectrum – 30 MHz – to terrestrial wireless services. *See* TMI 05-220 Reply Comments at 16; *Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, including Third Generation Wireless Systems,* Third Report and Order, Third Notice of Proposed Rulemaking and Second Memorandum Opinion and Order, 18 FCC Rcd 2223, 2238 (¶ 28) (2003); *see also* ICO Comments at 2 ("Terrestrial wireless interests that enjoy access to hundreds of MHz of spectrum, 30 MHz of which was reallocated from the 2 GHz MSS band merely two years ago, still seek to grab even more MSS spectrum and prolong the existing regulatory uncertainty."). The FCC has assigned 5 MHz of this spectrum to Nextel, and the remaining spectrum will become available shortly. *See* SIA Comments at 4 & n.14; TMI 05-220 Reply Comments at 16-17 & n.39; *see also* 800 MHz R&O, 19 FCC Rcd 14969 (2004).

IV. CONCLUSION.

Based on the foregoing, Sirius respectfully requests that the Commission initiate a rulemaking proceeding to reallocate the 24 MHz of unassigned 2 GHz MSS spectrum to satellite DARS and to authorize Sirius to use such spectrum for its satellite DARS system.

Respectfully submitted,

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Dated: August 15, 2005

Principal Allocations for Mobile-Satellite Service

| Downlink (MHz) | Uplink (MHz) |
|----------------|--------------|
|----------------|--------------|

L-Band 1525-1559 1626.5-1660.5

Big LEO 2483.5-2500 1610-1626.5

2 GHz <u>2180-2188</u> <u>2010-2018</u>

Total Allocations: 58.5 MHz 58.5 MHz

Principal Allocations for Terrestrial Commercial Wireless

| * LICENSEU SELVICES. | • | Licensed Services: |
|----------------------|---|---------------------------|
|----------------------|---|---------------------------|

| _ | Lower 700 MHz | | 48 MHz |
|---|--------------------------------|-------|---------------|
| _ | Upper 700 MHz | | 36 MHz |
| _ | 800 MHz Cellular | | 50 MHz |
| _ | 800 MHz SMR | | 16 MHz |
| _ | 900 MHz SMR | | 5 MHz |
| _ | 1.4 GHz | | 8 MHz |
| _ | Narrowband PCS | | 3 MHz |
| _ | Broadband PCS | | 130 MHz |
| _ | MSS ATC | | 45 MHz |
| _ | Advanced Wireless Services | | 130 MHz |
| _ | Broadband Radio Service (MMDS) | | 190 MHz |
| _ | 3650-3700 MHz | | <u>50 MHz</u> |
| | | Total | 711MHz |

Unlicensed Devices (Suitable for Wi-Fi & Wi-Max deployment):

| | | Total | 674 5 MHz |
|---|-----------------|-------|----------------|
| _ | 5 GHz | | <u>555 MHz</u> |
| _ | 2400-2483.5 MHz | | 83.5 MHz |
| _ | 1920-1930 MHz | | 10 MHz |
| _ | 900 MHz | | 26 MHz |